WaveGuide™

Service & Troubleshooting

M&S Systems is committed to producing high quality audio products for the home. If you have any questions or problems with the speaker systems or the system is not operating properly, contact your WaveGuide installer or call M&S Systems at (800) 366-9422.

M&S SYSTEMS™

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WaveGuide™

In-Wall & Ceiling Speakers

Owner's Manual

Part Numbers

WG100C	WG100W
WG150C	WG150W

Introduction

WaveGuide ceiling and in-wall speakers are designed to provide clear, sharply-focused audio reproduction while remaining unobtrusive in the background. These speakers bring out the best in any home theater or whole-house stereo system. These products also offer many features, including:

- 1” Asymmetrical Aluminum Dome Tweeter
- Slide switches for bass and treble control (+/-3dB)
- Cam-lock mounting system with isolated rubber pads to reduce vibration
- Kevlar cone for low distortion and smooth response
- Molded in IR lens that allows installation of an infra-red receiver through the speaker baffle
- Gasket around the baffle to provide an acoustic seal

Description

Ceiling Speakers (Sold in Pairs)

WG100C

Frequency Response	50Hz to 20kHz (+/-3db)
Maximum Power Rating	100 Watts
Impedance Rating	8-Ohms
Overall Speaker Dimension	9” Diameter
Specifications	6” Kevlar cone woofer; 1” asymmetrical aluminum dome tweeter
Mounting Dimension w/o Mounting Ring	7 1/2” Diameter
Mounting Ring Dimension	8 3/16” Diameter
Grille	Aluminum
Color	White

WARRANTY

M&S Systems™ Limited 10-Year Warranty for WaveGuide™ Speakers and AirVac™ Gold Power Units

M&S Systems offers a 10-Year Warranty on our WaveGuide™ speakers and AirVac™ Gold power units. This warranty is identical to the M&S Systems™ 2-Year Warranty, with the exception that this warranty covers the WaveGuide™ speakers and AirVac™ Gold power units for 10 years instead of 2. The M&S Systems™ 10-Year Warranty applies ONLY to the WaveGuide™ speakers and AirVac™ Gold power units and to no other M&S Systems™, M&S™ 8- ohm or AirVac™ products.

M&S Systems Limited 2-Year Warranty

M&S Systems warrants its products to be free of defects for 2 years. Except for the WaveGuide™ Speakers and AirVac™ Gold power units (See above). The warranty period begins on either (a) the date of purchase or installation date of this product or (b) the date of closing on a new residence in which this product was originally installed.

The warranty extends to the original user of the product and to each subsequent owner of the product during the term of the warranty. M&S™ will repair or replace, at its option, parts and materials at no charge. Parts supplied under this warranty may be new or rebuilt at the option of M&S Systems™.

If during the warranty period the product appears to have a defect, please call our toll free service number (800-366-9422) prior to dismantling. Dismantling the product prior to calling our service number may void the warranty. Before returning any product to M&S Systems™, obtain a Return Authorization Number (RAN) from our service department. M&S Systems will return the repaired product freight prepaid within the continental United States. ANY PRODUCT RETURNED TO M&S SYSTEMS WITHOUT A RAN NUMBER WILL BE REFUSED.

This limited warranty is in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose or otherwise, and of any other obligations or liability on the seller’s part. This limited warranty does not cover damage caused by improper installation, acts of God, criminal acts, the violation of applicable building or electrical codes or the use of non-M&S wire, cable (excluding CAT5 and RG-6) or wall housings.

Under no circumstances shall M&S Systems™ be liable for consequential, incidental or special damages arising in connection with use, or inability to use this product. In no event shall M&S Systems™ liability hereunder exceed the cost of the product covered hereby. No person is authorized to assume for us or obligate us for any other liability in connection with the sale of this product. Some states do not allow the exclusion or limitation of consequential, incidental or special damages, so the above limitation or exclusion may not apply to you. This limited warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

red wire in the red terminal and the black wire in the black terminal. See figure 10. Make sure that none of the strands from the black and red wires are touching each other. This can create a short circuit that can damage your electronics. Mount the baffle to the frame using the 6 screws provided. Do not over tighten the mounting screws.

Step 12. After the speaker is mounted, adjustments to the swivel tweeter (small speaker) can be made by either directing the sound visually or by using a musical source to determine the best sound coverage for the listening area. To position the tweeter, press at the outside edge of the tweeter housing (DO NOT PRESS ON THE CONE DIRECTLY).
Note the crease in the asymmetrical tweeter provides the highest directional response in this direction. See figure 11 on page 14.
If you require to disperse the sound in a 360-degree pattern you must position the line in the tweeter in a horizontal position. See figure 12 on page 15.
The combination of switch settings allow you to boost and cut bass and treble +/-3dB. Adjust the speaker level to accommodate for room acoustics. See figure 13 on page 15.

Step 13. Divide each adhesive bead strip in half. (Adhesive bead strips are in the clear self-closing bag). Place strips on the edge of the grille as shown in figure 14 on page 15. Reinstall the grille on the speaker.

Step 14. Adhere the WaveGuide logo to the grille with the pressure sensitive tape.

WG150C

Frequency Response	35Hz to 20kHz (+/-3db)
Maximum Power Rating	150 Watts
Impedance Rating	8-Ohms
Overall Dimensions	10 7/8” Diameter
Specifications	8” Kevlar cone woofer; 1” asymmetrical aluminum dome tweeter
Mounting Dimension w/o Mounting Ring	9 5/8” Diameter
Mounting Ring Dimension	10 1/16” Diameter
Grille	Aluminum
Color	White

In-Wall Speakers (Sold in Pairs)

WG100W

Frequency Response	50Hz to 20kHz (+/-3db)
Maximum Power Rating	100 Watts
Impedance Rating	8-Ohms
Overall Dimensions	9” W x 12 5/16” H
Specifications	6” Kevlar cone woofer; 1” asymmetrical aluminum dome tweeter
Mounting Dimension w/o Mounting Ring	7 1/2” W x 10 13/16” H
Mounting Ring Dimension	7 15/16” W x 11” H
Grille	Aluminum
Color	White

WG150W

Frequency Response	35Hz to 20kHz (+/-3db)
Maximum Power Rating	150 Watts
Impedance Rating	8-Ohms
Overall Dimensions	10 1/4" W x 14 15/16" H
Specifications	8" Kevlar cone woofer; 1" asymmetrical aluminum dome tweeter
Mounting Dimensions w/o ring	8 11/16" W x12 3/4" H
Mounting Ring Dimension	9 3/16" W x 13 3/16" H
Grille	Aluminum
Color	White

Unpacking Your Speakers

Before you unpack your speakers, be extra careful **not to touch** the cone and tweeter materials. After carefully unpacking your speakers, the carton and the packing material should be saved for possible use later. If any speaker appears to be damaged, do not attempt to repair or to connect the unit to the amplifier. Repack the speaker and notify your distributor or M&S Systems for replacement or repair.

Speaker Location

Ceiling Installation

Careful consideration must be given to the speaker location to realize the full frequency range. Ceiling speakers should be spaced 6 to 8 feet (6 feet for 8-foot ceilings and 8 feet for 10-

tearing wallpaper. Then use a drywall or keyhole saw to cut along the scored line. Make sure that you do not cut the hole larger than the outline.

Step 7. Be sure to clear any insulation material from the speaker back.

Step 8. After you have determined the speaker locations secure a 16 gauge 2 conductor cable to the stud using an insulated staple. Leave at least 18 inches of additional cable for connection during final speaker installation. Run the other end of the speaker cable to the audio source.

Step 9. Prepare the speaker wiring by stripping off approximately 3 inches of the outer jacket (care should be taken so the insulation on the wires inside the jacket are not damaged) also strip approximately 3/8 inch off the ends of the two inside conductors. Twist the ends of the stranded cable so the wires are tight.

Step 10. Follow the instructions included with the volume control and amplifier.

Step 11. You are now ready to install the frame. Remove the paint mask. **Be careful not to touch the speaker cones and tweeters when removing the paint mask in order to prevent any damage.** Remove the baffle from the frame and fasten the frame to the drywall. Index the mounting tabs to make sure that all tabs will clear the opening. Insert the frame in the wall and tighten the tabs with the screws on the front of the baffle. Attach the speaker cable to the speaker by pressing down on the red (+) or black (-) gold-plated push terminals and inserting the

sound. When the sound is deeper and more hollow sounding, you are between studs. When the sound is sharper and more flat sounding, you are close or over a stud.

- Identify studs by the position of electrical outlets or switches. There may be a stud directly to the left or right of these electrical fixture. This gives you a point of measurement since studs are either 24 or 16 inches on center in newer houses, 12 inches in older homes.

Step 2. When you are sure of where the wall's studs are (and are completely sure there isn't an electrical cable, water pipe or heating duct in that vicinity of the wall), use a level and position the cardboard mounting template, and draw around the outer perimeter with a pencil.

Step 3. Drill a 1-inch hole in the center of the pencil outline which you have just drawn, just deep enough to fully penetrate the drywall.

Step 4. Obtain a length of stiff wire such as a straightened wire cost hanger. Bend it so that the last 6 or 8 inches is at a right angle to the rest.

Step 5. Insert the bent part into the 1-inch hole you just drilled and probe to the left and the right to confirm that a stud is not too close on either side. Move the wire around in a circular motion to check clearances above and below the hole as well.

Step 6. If there are no obstructions, carefully score the penciled outline of the template with a sharp utility knife to avoid chipping paint or

foot ceilings and above) apart but no closer than 2 feet to any adjacent wall. Avoid placing speakers in air return cavities. Some type of protection will be required for the back of the speaker if blown insulation is used. The following is a partial list of ways to protect the speaker:

- Use an RE-16 speaker cover
- Use a piece of wood that will cover at least 3 feet on either side of the speaker opening. The ends may be partially closed to keep the blown insulation from reaching the speaker, however, a minimum gap of 2 inches at each end is better than a sealed box
- Use a piece of bat insulation at least 3 inches thick over the back of the speaker. This insulation should not have a backing or if it does, the backing must be installed facing away from the speaker.
- Use a fine mesh to cover the back of the speaker to protect against bulk type insulation materials. This will not work with insulation containing fine powders.

Do not install speakers in joist cavities containing 120/240V appliances, within 18 inches of dimmer light fixtures, security wiring and other control wiring.

In-wall Installation

Careful consideration must be given to the speaker location to realize the full frequency range. In-wall speakers should be spaced 6 to 8 feet apart but no closer than 2 feet to any adjacent wall or ceiling. Typical height from the floor would be in the 4 to 6 foot range. Avoid placing speakers in air return wall cavities, outside walls or walls containing plumbing. To reduce vibration into a room on the back side

of the speaker, use a piece of bat insulation at least 3 inches thick in the stud cavity. This insulation should not have a backing or if it does, the backing must be installed facing away from the speaker. The insulation should extend about 2 ft. on either side of the speaker opening.
Do not install speakers in outside walls, stud cavities containing 120/240V appliances, within 18 inches of dimmers, security wiring and other control wiring.

Speaker Installation for New Construction

Ceiling Speakers

Step 1. Speaker mounting rings are used in the pre-construction phase of speaker installation during construction of new homes and additions. WaveGuide mounting rings are designed to provide drywall installers the correct cut-out pattern for the speakers. The mounting rings have "flaps" that are nailed/ screwed/ stapled onto the joist. See figure 1. Once the wall board is installed, the opening is cut out to mount the speaker.

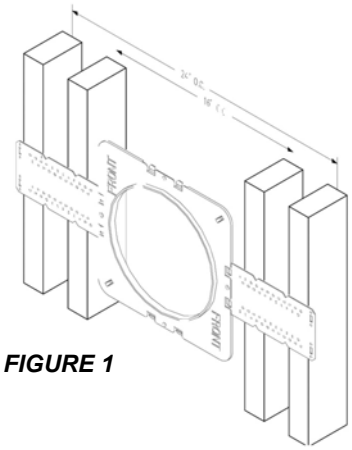


FIGURE 1

When installing the mounting ring, note that there are holes molded into the mounting ring for

If you require to disperse the sound in a 360-degree pattern you must position the line in the tweeter in a horizontal position. See figure 5 on page 10.
The combination of switch settings allow you to boost and cut bass and treble +/-3dB. Adjust the speaker level to accommodate for room acoustics. See figure 6 on page 10.

Step 13. Divide each adhesive bead strip in half. (Adhesive bead strips are in the clear self-closing bag). Place strips on the edge of the grille as shown in figure 7 on page 10. Reinstall the grille on the speaker.

Step 14. Adhere the WaveGuide logo to the grille with the pressure sensitive tape.

Repeat steps for the second speaker.

In-wall Speakers

For existing construction, the use of rough-in rings can not occur. The following steps outline how to locate a section between two wall studs, mark the outer boundaries of the hole, drill a small hole in the center to verify the location and then cut the main hole.

Step 1. Determine the location of the wall studs so the speaker can be centered approximately between them. There are several ways to go about this:

- Use an electronic stud finder. Many stud finders can also indicate the location of live AC wiring.
- Tap on the wall and listen to the resulting

stranded cable so the wires are tight.

Step 10. Follow the instructions included with the volume control and amplifier.

Step 11. You are now ready to install the speaker. Remove the paint mask from the baffle. **Be careful not to touch the speaker cones and tweeter *when removing the paint mask* in order to prevent any damage.** Attach the speaker cable to the speaker by pressing down on the red (+) or black (-) gold-plated push terminals and inserting the red wire in the red terminal and the black wire in the black terminal. See Figure 3 on page 8. Make sure that none of the strands from the black and red wires are touching each other. This can create a short circuit that can damage your electronics. Index the mounting tabs to make sure that all tabs will clear the opening. Insert the speaker in the ceiling and tighten the tabs with the screws on the front of the grille. DO NOT OVERTIGHTEN THE SCREWS, the screws should only be tight enough to secure the speaker.

Step 12. After the speaker is mounted, adjustments to the swivel tweeter (small speaker) can be made by either directing the sound visually or by using a musical source to determine the best sound coverage for the listening area. To position the tweeter, press at the outside edge of the tweeter housing (DO NOT PRESS ON THE TWEETER CONE DIRECTLY).
Note the crease in the asymmetrical tweeter provides the highest directional response in this direction. See figure 4 on page 9.

speaker wire tie-off.

TIPS FOR NEW CONSTRUCTION

- If possible, run speaker wires after AC wiring is in place to avoid additional noise caused by close proximity of wiring.
- Secure the speaker wires against a joist with insulated staples, being careful not to pierce the wire insulation. Allow slack for building material expansion.
- Horizontal wire runs should be routed through holes drilled at equal heights in the joist.
- Do not install the actual speaker until the wall board is in place. Until then leave several feet of wire secured to the back of the mounting ring. The excess wire can be removed during final installation.
- During the drywall installation, make sure the speaker cut-out hole does not extend farther than 1/4 inch from the inside of the mounting ring. The flat rough-in rings and flaps are thin enough that they won't interfere with wall board installation.

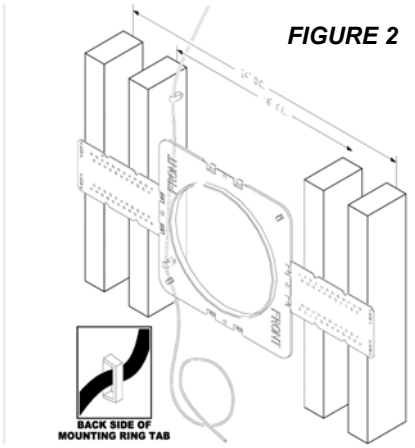


FIGURE 2

Step 2. After you have determined the speaker locations using the guidelines above, secure a 16 gauge 2-conductor cable to the mounting ring

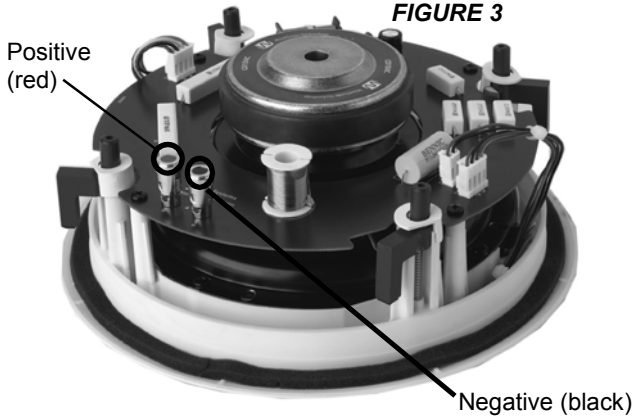
tabs (see figure 2), such as the M&S Systems MS16X, for attachment to the speakers after the dry wall has been installed. Leave at least 18 inches additional cable for the connection during final speaker installation. Run the other end of the speaker cable to the audio source.
NOTE: Make a drawing of each speaker location. This will assist you in locating the wires if they have been covered after the wall board has been installed.

Step 3. This is the finish-out stage. Prepare the speaker wiring by stripping off approximately 3 inches of the outer jacket (care should be taken so the insulation on the wires inside the jacket are not damaged) also strip approximately 3/8 inch off the ends of the two inside conductors. Twist the ends of the stranded cable so the wires are tight.

Step 4. Follow the instructions included with the volume control and amplifier.

Step 5. You are now ready to install the speaker.

FIGURE 3



pencil outline which you have just drawn, just deep enough to fully penetrate the drywall.

Step 4. Obtain a length of stiff wire such as a straightened wire cost hanger. Bend it so that the last 6 or 8 inches is at a right angle to the rest.

Step 5. Insert the bent part into the 1-inch hole you just drilled and probe to the left and the right to confirm that a joist is not too close on either side. Move the wire around in a circular motion to check clearances above and below the hole as well.

Step 6. If there are no obstructions, carefully score the penciled outline of the template with a sharp utility knife to avoid chipping paint or tearing wallpaper. Then use a drywall or keyhole saw to cut along the scored line. Make sure that you do not cut the hole larger than the outline.

Step 7. Be sure to clear any insulation material from the speaker back.

Step 8. After you have determined the speaker locations secure a 16 gauge 2 conductor cable to the joist using an insulated staple. Leave at least 18 inches of additional cable for connection during final speaker installation. Run the other end of the speaker cable to the audio source.

Step 9. Prepare the speaker wiring by stripping off approximately 3 inches of the outer jacket (care should be taken so the insulation on the wires inside the jacket are not damaged) also strip approximately 3/8 inch off the ends of the two inside conductors. Twist the ends of the

Speaker Installation for Existing Construction

Ceiling Speakers

For existing construction, the use of mounting rings can not occur. The following steps outline how to locate a section between two joists, mark the outer boundaries of the hole, drill a small hole in the center to verify the location and then cut the main hole.

Step 1. Determine the location of the joists so the speaker can be centered approximately between them. There are several ways to go about this:

- Use an electronic stud finder. Many finders can also indicate the location of live AC wiring.
- Tap on the wall and listen to the resulting sound. When the sound is deeper and more hollow sounding, you are between joists. When the sound is sharper and more flat sounding, you are close or over a stud.
- Identify joists by the position of electrical light fixtures. There may be a joist directly to the left or right of these electrical fixture. This gives you a point of measurement since joists are either 24 or 16 inches on center in newer houses, 12 inches in older homes.

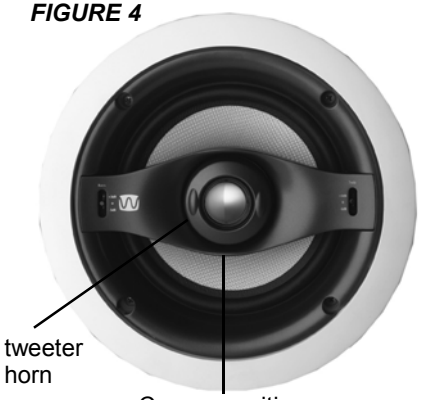
Step 2. When you are sure of where the ceiling's joists are (and are completely sure there isn't an electrical cable, water pipe or heating duct in that vicinity of the wall), position the cardboard mounting template, and draw around the outer perimeter with a pencil.

Step 3. Drill a 1-inch hole in the center of the

Remove the paint mask from the baffle. **Be careful not to touch the speaker cones and tweeter *when removing the paint mask* in order to prevent any damage.** Attach the speaker cable to the speaker by pressing down on the red (+) or black (-) gold-plated push terminals and inserting the red wire in the red terminal and the black wire in the black terminal. See Figure 3. Make sure that none of the strands from the black and red wires are touching each other. This can create a short circuit that can damage your electronics. Index the mounting tabs to make sure that all tabs will clear the opening. Insert the speaker in the ceiling and tighten the tabs with the screws on the front of the grille. DO NOT OVERTIGHTEN THE SCREWS, the screws should only be tight enough to secure the speaker.

Step 6. After the speaker is mounted, adjustments to the swivel tweeter (small speaker) can be made by either directing the sound visually or by using a musical source to determine the best sound coverage for the listening area. To position the tweeter, press at the outside edge of the tweeter housing (DO NOT PRESS ON THE TWEETER CONE DIRECTLY). Note (see figure 4) the crease in the asymmetrical

FIGURE 4



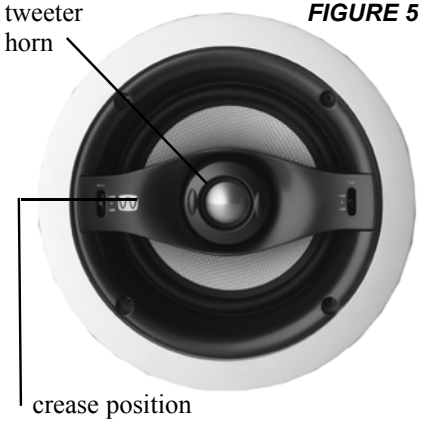


FIGURE 5

tweeter provides the highest directional response in this direction.
See figure 5. If you require to disperse the sound in a 360-degree pattern you must position the line in the tweeter in a horizontal position.

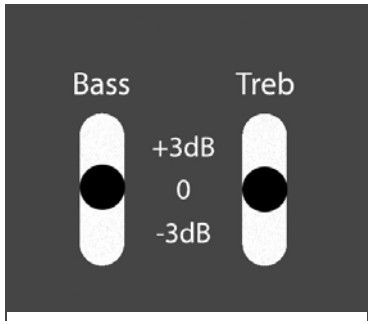


FIGURE 6

See figure 6. The combination of switch settings allow you to boost and cut bass and treble +/-3dB. Adjust the speaker level to accommodate for room acoustics.

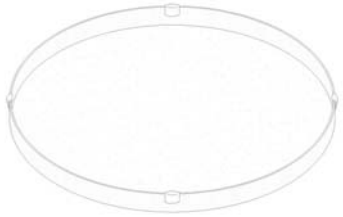


FIGURE 7

Step 7. Divide each adhesive bead strip in half. (Adhesive bead strips are in the clear self-closing bag). Place strips on the edge of the grille as shown in figure 7. Reinstall the grille on the speaker.

Step 8. Adhere the WaveGuide logo to the grille with the pressure sensitive tape.
Repeat the steps for the second speaker.

FIGURE 12

Step 7. Divide each adhesive bead strip in half. (Adhesive bead strips are in the clear self-closing bag). Place strips on the edge of the grille as shown in figure 14. Reinstall the grill on the speaker.

Step 8. Adhere the WaveGuide logo to the grille with the pressure sensitive tape.

Repeat the steps for the second speaker.

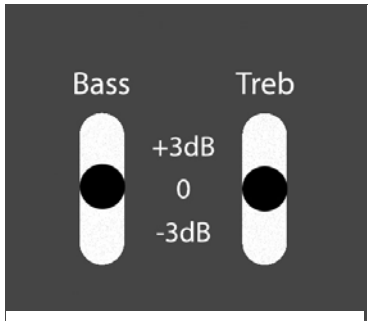


FIGURE 13

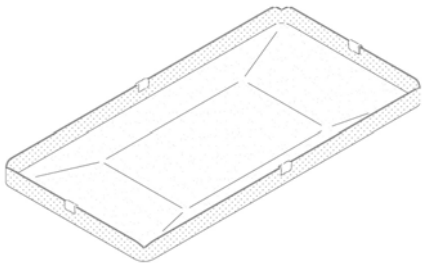


FIGURE 14

touching each other. This can create a short circuit that can damage your electronics. Mount the baffle using the 6 screws provided. DO NOT OVERTIGHTEN THE SCREWS, the screws should on only be tight enough to secure the speaker.

Step 6. After the speaker is mounted, adjustments to the swivel tweeter (small speaker) can be made by either directing the sound visually or by using a musical source to determine the best sound coverage for the listening area. To position the tweeter, press at the outside edge of the tweeter housing (DO NOT PRESS ON THE CONE DIRECTLY).
Note the crease in the asymmetrical tweeter provides the highest directional response in this direction. See figure 11.

FIGURE 11

If you require to disperse the sound in a 360-degree pattern you must position the line in the tweeter in a horizontal position. See figure 12.
The combination of switch settings allow you to boost and cut bass and treble +/- 3dB. Adjust the speaker level to accommodate for room acoustics. See figure 13.

In-wall Speakers

Step 1. Speaker mounting rings are used in the pre-construction phase of speaker installation during construction of new homes and additions. WaveGuide mounting rings are designed to provide drywall installers the correct cut-out pattern for the speakers. The rings have “flaps” that are nailed/screwed/stapled onto the studs. See figure 8.
Once the wall board is installed, the opening is cut out and the speaker frame is inserted into the mounting ring.

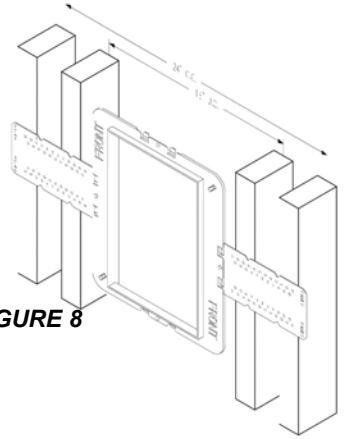


FIGURE 8

When installing the mounting ring, note that there are holes molded into the mounting ring for speaker wire tie-off.

TIPS FOR NEW CONSTRUCTION

- Use a small level to verify that the mounting ring is straight.
- If possible, run speaker wires after AC wiring is in place to avoid additional noise caused by close proximity of wiring.
- Secure the speaker wires against a stud with insulated staples, being careful not to pierce the wire insulation. Allow slack for building material expansion.

- Horizontal wire runs should be routed through holes drilled at equal heights in the studs.
- Do not install the actual speaker until the wall board is in place. Until then leave several feet of wire secured to the back of the mounting ring. The excess wire can be removed during final installation.

During the drywall installation, make sure the speaker cut-out hole does not extend farther than 1/4 inch from the inside of the mounting ring. The flat rough-in rings and flaps are thin enough that they won't interfere with installation.

Step 2. After you have determined the speaker locations using the guidelines above, secure a 16 gauge 2 conductor cable to the mounting ring tabs (see figure 9), such as the M&S Systems MS16X, for attachment to the speakers after the dry wall has been installed. Leave at least 18 inches additional cable for the connection during final speaker installation. Run the other end of the speaker cable to the audio source.

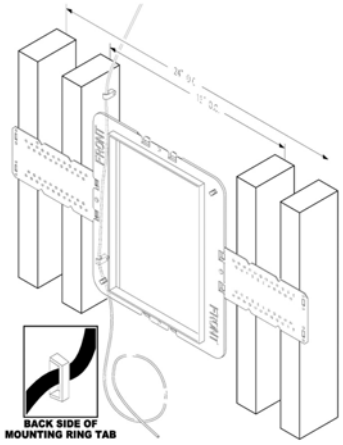


FIGURE 9

NOTE: Make a drawing of each speaker location. This will assist you in locating the wires that have been covered after the sheet rock has been

installed.

Step 3. This is the finish-out stage. Prepare the speaker wiring by stripping off approximately 3 inches of the outer jacket (care should be taken so the insulation on the wires inside the jacket are not damaged) also strip approximately 3/8 inch off the ends of the two inside conductors. Twist the ends of the stranded cable so the wires are tight.

Step 4. Follow the instructions included with the volume control and amplifier.

Step 5. You are now ready to install the frame. Remove the paint mask. **Be careful not to touch the speaker cones and tweeters when removing the paint mask in order to prevent any damage.** Remove the baffle from the frame and fasten the frame to the pre-construction bracket. Attach the speaker cable to the speaker by pressing down on the red (+) or black (-) gold-plated push terminals and inserting the red wire in the red terminal and the black wire in the black terminal. See figure 10. Make sure that none of the strands from the black and red wires are

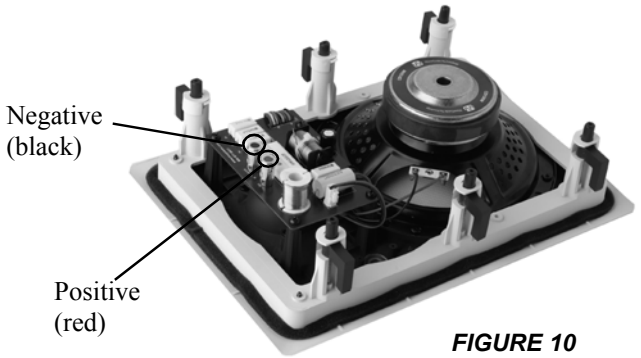


FIGURE 10